RICOH

RP132x Series

Low Voltage 1A LDO with Ext. V_{OUT} Adjustable

The RP132x Series are CMOS-based LDO regulators featuring 1A output with low on-resistance. RP132x offers almost the same basic performances as the RP131x Series. But RP132x offers an excellent load regulation. While the output voltage is internally set in the RP131x Series, the RP132x Series is available in two versions: standard version in which the output voltage is internally set and the adjusted version in which it is set with an external resistor. RP132x has an inrush current limit circuit that limits approximately 500mA when the voltage regulator turns on. The E/F Version can set the inrush current limit time by connecting a capacitor with DELAY pin.

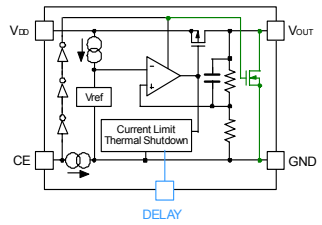
FEATURES

- Supply Current (I_{SS}) ····· Typ. 65μA (I_{OUT}=0mA, V_{IN}=6.5V)
- Standby Current ($I_{standby}$) ····· Typ. 0.15μA (V_{IN}=6.5V, CE="L")
- Dropout Voltage (V_{DIF}) ····· Typ. 0.52V (I_{OUT}=1A, V_{OUT}=2.8V)
- Ripple Rejection (RR) ····· Typ. 70dB (f=1kHz, V_{OUT} ≤ 3.3V)
- Input Voltage Range (V_{IN}) ····· 1.4V to 6.5V
- Output Voltage Range (V_{OUT}) ····· 0.8V to 5.5V (internally fixed)
  0.8V to 5.5V with external resistors
- Output Voltage Accuracy ····· ± 1%
- Temp. coeff. of Output Voltage ····· Typ. ± 60ppm/°C
- Line Regulation ····· Typ. 0.05%/V
- Load Regulation ····· Typ. 3mV(I_{OUT}=300mA)
  Typ. 5mV(I_{OUT}=1A)
- Fold-back Protection Circuit ····· Current limit Typ. 250mA
- Inrush Current Limit Circuit ····· Typ. 500mA(for 500μs after start-up)
- Thermal Shutdown Circuit ····· Stops at 165°C.
- Auto-Discharge function ····· D/F Version
- Packages ····· DFN (PLP)1820-6, SOT-89-5, HSOP-6J, TO-252-5-P2
- Ceramic capacitors can be used. ··· 2.2μF or more (V_{OUT} ≤ 3.6V)

(The above shows specification at Topt=25°C. Design assurance value at -40°C ≤ Topt ≤ 85°C is also available. For details, please refer to the datasheet.)

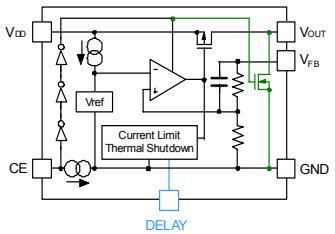
BLOCK DIAGRAMS

RP132S/Hxx1x
(Internally fixed output voltage type)



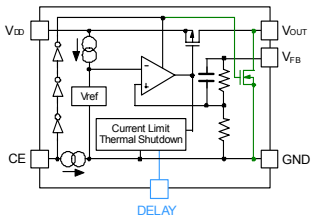
Blue line: only RP132Sxx1E/F Green line: RP132S/Hxx1D, RP132Sxx1F

RP132J/Kxx1x
(Internally fixed output voltage type)



Blue line: only RP132Kxx1E/F Green line: RP132K/Jxx1D, RP132Kxx1F

RP132x001x
(Externally adjustable output voltage type)



Blue line: only RP132K0001E/F Green line: RP132x001D, RP132K001F

SELECTION GUIDES

Halogen Free	Package	Q'ty per Reel	Part No.
H/F	DFN(PLP)1820-6	5,000 pcs	RP132K xx 1 ∗ -TR
H/F	SOT-89-5	1,000 pcs	RP132H xx 1 # -T1-FE
H/F	HSOP-6J	1,000 pcs	RP132S xx 1 ∗ -E2-FE
H/F	TO-252-5-P2	3,000 pcs	RP132J xx 1 # -T1-FE

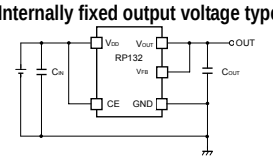
xx :Specify the output voltage within the range of 0.8V (08) to 5.5V (55) in 0.1V steps. For the externally adjustable output voltage type (00).

:Select from (B) without auto-discharge function or (D) with auto-discharge function.

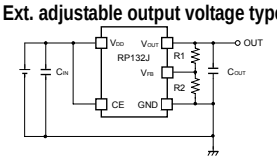
∗ :Select from (B) without auto-discharge function or (D) with auto-discharge function, (E) without auto-discharge function, with inrush current limit time adjustable pin, (F) with auto-discharge function, with inrush current limit time adjustable pin. (RP132S001E/F is not available)

TYPICAL APPLICATIONS

RP132J/Kxx1x
Internally fixed output voltage type

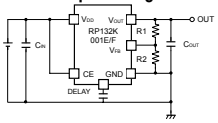


RP132x001x
Ext. adjustable output voltage type



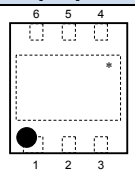
CIN : 2.2μF or more、
COUT : 2.2μF or more (V_{OUT} ≤ 3.6V)
4.7μF or more (V_{OUT} > 3.6V)
Please refer to the datasheet for details of the externally adjustable output voltage type.

RP132K001E/F
Ext. adjustable output voltage with DELAY pin



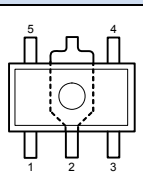
PACKAGES (Top View)

DFN(PLP)1820-6



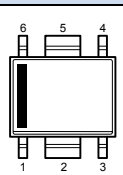
1	VOUT
2	VFB
3	GND
4	CE
5	NC or DELAY
6	VDD

SOT-89-5



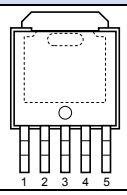
1	CE or VFB
2	GND
3	NC or CE
4	VDD
5	VOUT

HSOP-6J



1	VOUT
2	GND
3	NC or VFB or DELAY
4	CE
5	GND
6	VDD

TO-252-5-P2

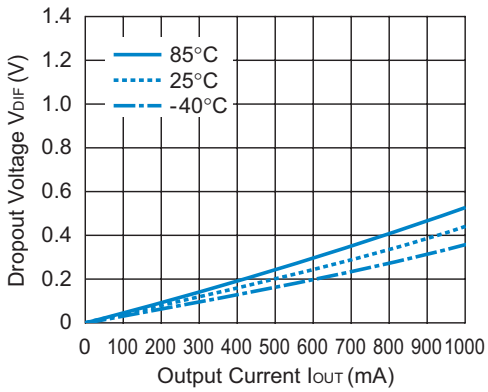


1	CE
2	VDD
3	GND
4	VOUT
5	VDD

∗) The tab is substrate level (GND).

TYPICAL CHARACTERISTIC

RP132x331x Dropout Voltage vs. Output Current



APPLICATIONS

- Power source for hand-held communication equipment, cameras, and VCRs
- Power source for laptop personal computers and home appliances
- Power source for battery-powered equipment

Low Voltage 1A LDO with Ext. V_{OUT} Adjustable

Technical Information on Ricoh LDO Regulators

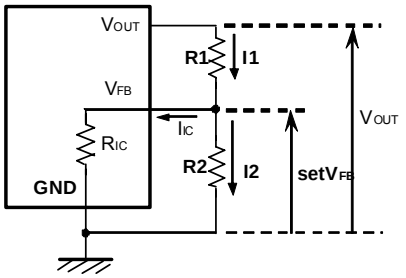
Adjustable Output Voltage Type

Adjustable Output Voltage Type Settings

The externally adjustable output voltage type can adjust the output voltage by using the external division resistance.
If the V_{FB} voltage is described as set V_{FB}, the output voltage can be set by using the following equations (set V_{FB}:0.8V)
For better accuracy, choosing R1 (<<RIC) reduces this error.（RIC=Typ.1.3MΩ:(guaranteed by design), Topt=25°C）

The output voltage without the error-causing factor

V_{OUT} = Set V_{FB} x ((R1 + R2) / R2)



Notes

- The V_{OUT} pin of RP132x081x should be connected to the V_{FB} pin.
- RP132x081x can be adjusted the output voltage up to 5.5V.
- Please use 16kΩ or less for R2 resistor.

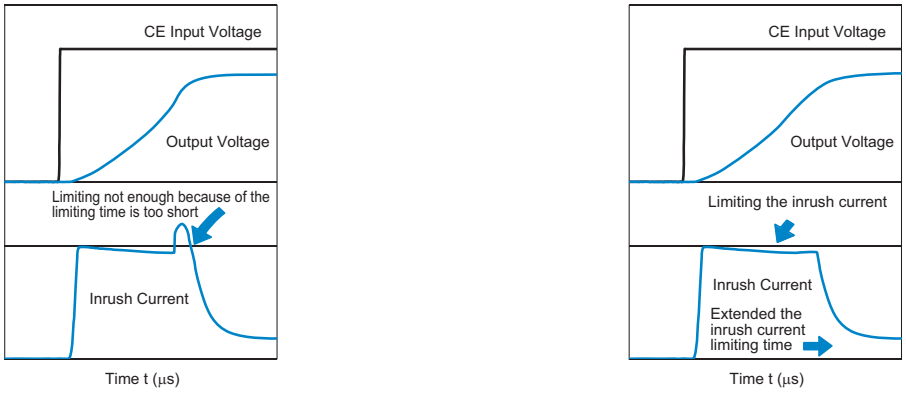
Inrush Current Limit Time Adjustable Function

If you need to limit the inrush current completely in case of using the large output capacitor, Ricoh recommends the product equipped with the Inrush Current Limit Time Adjustable Function.
The inrush current limit circuit of the RP132x Series has a DELAY pin and is able to adjust time of the inrush current limitation by connecting capacitor with a DELAY pin. (Graph 4)
The relation between the inrush current limit time (t_D) and the capacitance of the capacitor connecting with DELAY pin (C_D(F)) is calculatable by the following formula;

$$t_D = (C_D + 70 \times 10^{-12}) \times 0.525 \times 10^{6}$$

The inrush current is limited even if the capacitor is not connected with the DELAY pin. In this case, the time is calculated as C_D=0 by the formula above. (t_D = about 37μs)
When you do not use C_D of E/F version, the delay pin should be open.

Imaginary graph



(Graph 4)

Good Load Regulation

RP132x is less affected by the output current load because it separates the output voltage pin and the feedback voltage pin.
So, RP132x is very good load regulation, the load regulation is Typ.5mV (I_{OUT}=1A)

Ricoh Co.,LTD. Electronic Devices Company

■ **Ricoh presented with the Japan Management Quality Award for 1999.**
Ricoh continually strives to promote customer satisfaction, and shares the achievements of its management quality improvement program with people and society.

■ **Ricoh awarded ISO 14001 certification.**
The Ricoh Group was awarded ISO 14001 certification, which is an international standard for environmental management systems, at both its domestic and overseas production facilities. Our current aim is to obtain ISO 14001 certification for all of our business offices.

RoHS Compliant
Ricoh completed the organization of the Lead-free production for all of our products. After Apr. 1, 2006, we will ship out the lead free products only. Thus, all products that will be shipped from now on comply with RoHS Directive.

http://www.ricoh.com/LSI/

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